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(54) **Hexagonal bottom sack with plastic inner sack and method for its manufacturing.**

Kreuzbodensack mit innerem Kunststoffsack und Verfahren zur Herstellung desselben

Sac à fond croisé comportant un sac interne en matière plastique et procédé pour sa fabrication.

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## Description

[0001] The invention relates to a hexagonal bottom sack as described in the preamble of claim 1. In addition, the invention relates to a sack which is to be provided with a hexagonal bottom, as described in the preamble of claim 8.

[0002] Furthermore the invention relates to a method for manufacturing hexagonal bottom sacks as described in the preamble of claim 7.

[0003] Such sacks are known and are used for instance for milk powder products, crop protection substances and pharmaceutical products. The plastic inner sack serves to protect the product from for instance moisture or action of oxygen, and on the other hand prevents that the environment is affected by the product, for instance because of penetration through the paper of grease or because the product, for instance a crop protection substance, enters the environment.

[0004] This type of sacks are automatically manufactured in flat shape, in order to deliver the sacks stacked on each other to the manufacturers of products with which the sacks are filled. In order to be able to manufacture this type of sack automatically the sealed lower edge of a plastic inner sack is glued to one inner wall of the paper outer sack, so that the inner sack when folding the hexagonal bottom is at all times abutting that wall of the outer sack and as a result of that does not hamper the folding device for folding the hexagonal bottom, which is inserted between the walls of the hexagonal bottom sack when the end where the hexagonal bottom has to be formed is still open. The inner sack is glued to the inner sides of the outer sack near the open upper side, so that the inner sack too opens well when the hexagonal bottom sack is filled in an automatic filling device. After filling, the top side of the sack is cut off, in the course of which the lateral gluing at the upper side of the sack is cut away, so that the plastic inner sack is no longer attached to the paper outer sack at the top. This also makes the upper edge suitable for the subsequent treatments. After that the plastic inner sack is closed, for instance by heatsealing which usually takes place right through the paper outer sack. Finally the entire sack is closed by sewing up, or by folding and fixing the upper edge of the sack. After opening the filled sack by pulling loose the sewingthread or loosening the folded down edge the inner sack is then separate from the outer sack at the top.

[0005] A disadvantage of the known hexagonal bottom sack is, that the plastic inner sack is glued to the paper outer sack at its lower edge, whereas in for instance pharmaceutical applications it is desirable to be able to take the inner sack with the product in it in its entirety out of the paper outer sack, without paper and/or glue residues being left behind on the inner sack. This known wish is taken into account in those cases by providing the inner sack with a perforation below the seal seam, by which the inner sack can be taken out by tear-

ing along the perforation. This however has the disadvantage that an additional treatment step is necessary for making the perforation, that extra material is needed, and that this extra material can be left behind as a band of plastic glued in the paper outer sack. This does not result in a good separation of material, which is undesirable from an environmental point of view. In hexagonal bottom sacks without perforation in the inner sack the entire plastic inner sack remains in the paper outer sack and is difficult to separate from it because of the gluing of the lower edge, which is undesirable from an environmental point of view.

[0006] Another disadvantage of the gluing of the lower edge of the inner sack is, that when unfolding the hexagonal bottom which is lying flat at manufacturing and transporting, the inner sack is kept against one inner wall of the outer sack by the folded-in portions of hexagonal bottom and because of that with regard to the outer sack has a shorter filling length. In order to obtain a complete filling of the hexagonal sack the plastic inner sack is therefore most of the time provided with a Z-fold, which during the filling should unfold. In this way the necessary extra length is obtained. However, in this way there is the danger of damaging the inner sack, because the Z-fold at filling is pushed down and with that creases in the inner sack are created as well. Disadvantageous is also the extra use of material.

[0007] US-A-3.929.275, US-A-5.393.143 and US-A-5.553.943 each disclose a sack and a method according to the preambles of claims 1, 6 and 7, respectively.

[0008] It is an objective of the invention to provide an improved hexagonal sack with plastic inner sack, which can be automatically manufactured. Another objective is the provision of such a sack, which can be manufactured with the usual machines. Another objective is the provision of such a sack, which can be manufactured in economically advantageous way.

[0009] According to the invention, this objective is reached with a hexagonal bottom sack as described in claim 1 and with a sack as described in claim 8.

[0010] In this way is reached that the plastic inner sack both in filled and emptied state can easily be taken out of the outer sack by the user, without glue and/or paper residues being left behind on the plastic inner sack and without plastic parts being left behind in the paper outer sack. In this way an environmentally sound hexagonal bottom sack is therefore provided. The sack can also be manufactured somewhat easier because the lower edge of the inner sack does not need to be glued and because in occurring cases no perforation has to be made.

[0011] The manufacturing of the hexagonal bottom sack according to the invention is facilitated because the paper outer sack or tube is provided with at least one recess at at least one side near the end of which the hexagonal bottom has been folded or is to be folded. In this way it is possible to engage the inner sack from the side, which is free on the location of the recess. This

engaging can take place with the aid of vacuum cups which are part of a usual folding device for the hexagonal bottom. The recess should have such a shape that the vacuum cups engage both the inner and outer sack or tube, or that some vacuum cups engage the inner sack and other vacuum cups engage the outer sack or tube. The recess in the paper outer sack or tube thus provides the advantage, that the folding device can remain unaltered and no extra means such as hooks or compressed air are necessary to force the plastic inner sack in one direction.

[0012] Because the inner sack is not glued in the hexagonal bottom the additional advantage is realized that during filling the inner sack can slide out of the (paper) hexagonal bottom. In this way the hexagonal bottom sack can in many cases be filled well, as the inner sack at filling is pulled out of the hexagonal bottom, resulting in an extra Z-fold not always being necessary.

[0013] According to a preferred embodiment the recess is rectangular, adjacent to the lower edge of the paper outer sack or tube, so that of a line of vacuum cups one half of each cup can engage the inner sack and the other half the outer sack or tube. Other shapes of the recess are also possible. The recess can, however, also serve to force the inner sack against the paper side wall without recess with the aid of compressed air, in which the vacuum cups should, on the contrary, not engage the inner sack.

[0014] According to a preferred embodiment the plastic inner sack is just as long as the paper outer sack or tube so that the inner sack at manufacturing can be entered in the hexagonal bottom sack or tube as one straight tube. Leaving out the Z-fold results in saving material and prevents damage during filling. The production without Z-fold is also more simple.

[0015] According to another preferred embodiment the plastic inner sack is provided with a Z-fold between the hexagonal bottom and the attachment of the outer sack, as a Z-fold may be necessary or desirable for some products with which the hexagonal bottom sack is filled.

[0016] Preferably the plastic inner sack is made of polyethylene, as this material is suitable for most products and can be sealed and glued well.

[0017] The invention also relates to a method for manufacturing hexagonal bottom sacks, as described in claim 7. By means of the underpressure means the inner tube is kept against one inner wall of the outer tube. On one side the underpressure means, for instance vacuum cups, can then for instance engage the transition between paper outer sack and plastic inner sack.

[0018] The invention will be elucidated on the basis of the drawing.

[0019] Figure 1 shows a stage in the manufacturing of a hexagonal bottom sack, not to scale, in view from above with the wall of the outer sack being partly left out.

[0020] Figure 2 shows the sack according to figure 1 with schematically indicated vacuum cups of a folding

device.

[0021] Figure 3 shows the sack according to figure 1 with a partly folded hexagonal bottom.

[0022] The figures 1, 2 and 3 show different stages in the forming of a hexagonal bottom sack consisting of a paper outer sack and a plastic inner sack.

[0023] When automatically manufacturing such hexagonal bottom sacks an endless broad paper strip is taken as starting point, which broad strip may consist of various layers, on which an endless plastic tube is put. The broad paper strip is subsequently folded around the plastic tube and by gluing an overlap shaped into a paper tube in which the plastic inner tube is incorporated. This total endless tube is subsequently cut into pieces of a certain length. The plastic inner tube was beforehand provided with transverse closing seals, of which the in-between length corresponds to the length of the finally cut-off pieces, in which the endless tube is cut off such that a seal always ends up near an end of a cut-off piece. This end later forms the lower side of the hexagonal bottom sack. Near the other end of the cut-off piece of tube glue is applied on discrete distances over the entire width of the broad paper strip, so that the plastic inner tube when folding up the broad paper strip is glued on its outside against the inner side of the paper outer tube.

[0024] Such a piece of tube is schematically shown in figure 1 and shows a paper piece of outer tube 1, indicated by shading to the right, of which in the left upper corner a part is cut away in order to show the plastic inner tube 2, indicated by shading to the left, and a transverse seal seam 4. (In the actual production process this left corner of the front wall of the paper piece of outer tube 1 is of course not cut away.) The right side of the piece of tube remains open during manufacturing the hexagonal bottom sack and here a gluing 3 is applied along the end. The paper outer tube 1 with the plastic inner tube 2 therein is in this state entirely flat.

[0025] Figure 1 shows that at the left edge of the piece of tube, which in this state is still open, from the front wall of the paper outer tube 1 a rectangular portion 5 is cut away, so that the plastic inner tube 2 is visible here.

[0026] In order to be able to manufacture a hexagonal bottom the left end of the paper outer tube 1 has to be opened, so that a folding device can be inserted between both walls in order to fold the hexagonal bottom. According to a known method this opening takes place with the help of vacuum cups on both sides of the paper outer tube, which suck themselves firmly to it and pull the paper walls apart from one another. Figure 2 shows that the vacuum cups 10 on the front side of the paper outer tube 1 also engage the plastic inner tube 2 which can be engaged at the location of the cut-out portion 5. When now the vacuum cups 10 are pulled away from the vacuum cups on the back side of the piece of outer tube 1, the plastic inner tube 2 is pulled along to the front. The folding device can now be inserted between the walls of the paper outer tube 1, without being hampered

by the plastic inner tube 2, after which the plastic inner tube 2 can be folded with the front wall of the paper outer tube 1.

[0027] Figure 3 shows the first stage in folding the hexagonal bottom in which the lower edge of the front portion of the paper outer tube 1 together with the lower edge of the plastic inner tube 2 are folded down on the front side of the paper inner tube 1. A rectangular open portion is visible with above and underneath it a triangular portion which is folded double, the rectangular portion and the two triangular portions together forming a left half 6 and a right half 7 of the hexagonal bottom. In the right half 7 the plastic inner tube 2 is visible in the rectangular portion. Also the seal seam 4 is visible therein. In the right half of the triangular portions the plastic inner tube 2 is folded down onto itself.

[0028] From the stage as shown in figure 3 the right half 7 is folded down onto itself along folding line 8, such that the recess 5 will again lie on top of the plastic inner tube, the folded half having a somewhat larger width than the unfolded half, and after that the left half 6 is folded down onto itself in the same way along folding line 9, such that the folded portion of the left half 6 partly covers the folded portion of the right half 7. The folded portion of the left half 6 is glued onto the folded portion of the right half 7, in which it is taken care of that the plastic inner tube 2 is not glued against the paper outer tube. Finally the hexagonal bottom is also provided with a paper sealing strip, which is glued against the hexagonal bottom.

[0029] The hexagonal bottom sack thus manufactured is a completely flat sack, which in the way described above can be automatically manufactured and can also be automatically filled. At filling the hexagonal bottom sack the paper walls are pulled apart from one another near the open end, during which also the plastic inner sack 2 is opened by the gluing 3. During filling the hexagonal bottom unfolds, and because the plastic inner sack near its lower end is not glued to the paper outer sack, the lower end of the plastic inner sack which is incorporated in the paper hexagonal bottom can slide out of the hexagonal bottom. In this way the plastic inner sack can be filled well and about the inner side of the paper outer sack well, so that in most cases it will not be necessary to include a Z-fold in the plastic inner sack.

[0030] After filling the top side of the sack is cut off, and at the same time the transverse gluing at the upper side of the sack is cut away, so that the plastic inner sack is no longer attached to the paper outer sack at the top. In this way the upper edge is also made suitable for the subsequent treatments. After that the plastic inner sack is closed, for instance by heatsealing, which usually takes place right through the paper outer sack. Finally the entire sack is closed by means of sewing up, or by folding down and fixing the upper edge of the sack. After opening the sack by pulling loose the sewingthread or loosening the folded down edge the plastic inner sack is therefore completely separate from the paper outer

sack and the plastic inner sack can if desired in its entirety, with filling and everything, be taken out of the paper outer sack. No plastic will be left behind in the paper outer sack in this way, so that from an environmental point of view a good separation of paper and plastic is obtained. Also when the plastic inner sack is not taken out filled, the plastic inner sack can, after emptying the hexagonal bottom sack, easily be taken out of the paper outer sack, because the plastic inner sack is not glued to the hexagonal bottom.

[0031] Instead of the rectangular recess 5 also one or more recesses with a different shape can be provided, as long as it is taken care of that the vacuum cups 10 of the usual folding device are also able to engage an uncovered portion of the plastic inner tube 2.

#### Claims

1. Hexagonal bottom sack with an open end and an end provided with a hexagonal bottom, comprising a paper outer tube or sack (1) and a plastic inner sack (2) made from a tube, in which near the open end the plastic inner sack is attached, particularly glued, with its outer side to the inner side of the outer tube or sack, and in which the plastic inner sack is closed, particularly sealed, near its other end and is folded with and in the hexagonal bottom, the plastic inner sack being separate from the hexagonal bottom, **characterized in that** the paper outer tube or sack (1) is provided with at least one recess (5) at at least one side, near the end of which the hexagonal bottom has been folded.
2. Hexagonal bottom sack according to claim 1, **characterized in that** the recess (5) is rectangular, adjacent to the edge of the paper outer tube (1).
3. Hexagonal bottom sack according to claim 1 or 2, **characterized in that** the plastic inner sack (2) is just as long as the paper outer tube (1).
4. Hexagonal bottom sack according to claim 1 or 2, **characterized in that** the plastic inner sack (2) is provided with a Z-fold between the bottom and the attachment to the outer tube.
5. Hexagonal bottom sack according to any one of the preceding claims, **characterized in that** the plastic inner sack (2) is made of polyethylene.
6. Hexagonal bottom sack according to any one of the preceding claims, **characterized in that** the hexagonal bottom is provided with a paper sealing strip, which is glued against the hexagonal bottom.
7. Method for manufacturing hexagonal bottom sacks according to claim 1, in which the hexagonal bottom

sacks are made from an endless paper tube with in it an endless plastic tube, together in a flat shape, which is cut into pieces, in which each piece of tube near the end where the hexagonal bottom is formed is opened with the help of underpressure means (10), which are active on both sides of the flat piece of tube, to insert folding means for folding the hexagonal bottom, the piece of plastic inner tube being folded unglued with and in the hexagonal bottom, **characterized in that** each paper piece of outer tube (1) is provided with at least one recess (5) at at least one side near the end where the hexagonal bottom is formed, and in that the underpressure means at one side of the flat piece of tube also engage the piece of plastic inner tube (2).

8. Sack with an open end and an end which is to be provided with a hexagonal bottom, comprising a paper outer tube (1) and a plastic inner sack (2), in which near the open end the plastic inner sack is attached, particularly glued, with its outer side to the inner side of the outer tube, and in which the plastic inner sack is closed, particularly sealed, near its other end and is to be folded with and in the hexagonal bottom, the plastic inner sack then being separate from the hexagonal bottom, **characterized in that** the paper outer tube (1) is provided with at least one recess (5) at at least one side, near the end of which the hexagonal bottom has to be folded.

#### Patentansprüche

1. Kreuzbodensack mit einem offenen Ende und einem mit einem Kreuzboden versehenen Ende, umfassend eine papiere Außenhülse oder -sack (1) und einen aus einer Hülse hergestellten Kunststoff-Innensack (2), wobei der Kunststoff-Innensack beim offenen Ende mit seiner Außenseite an der Innenseite der Außenhülse oder des -Sacks befestigt, insbesondere geleimt ist, und wobei der Kunststoff-Innensack bei seinem anderen Ende geschlossen, insbesondere versiegelt und in dem Kreuzboden mitgefaltet ist, wobei der Kunststoff-Innensack von dem Kreuzboden getrennt ist, **dadurch gekennzeichnet**, daß die Außenhülse oder -sack (1) an zumindest einer Seite, beim Ende wovon der Kreuzboden gefaltet ist, mit zumindest einer Aussparung (5) versehen ist.
2. Kreuzbodensack gemäß Anspruch 1, **dadurch gekennzeichnet**, daß die Aussparung (5) rechteckig ist, grenzend an den Rand der papiernen Außenhülse (1).
3. Kreuzbodensack gemäß Anspruch 1 oder 2, **dadurch gekennzeichnet**, daß der Kunststoff-Innensack (2) ebensolang ist als die papiere Außenhülse

(1).

4. Kreuzbodensack gemäß Anspruch 1 oder 2, **dadurch gekennzeichnet**, daß der Kunststoff-Innensack (2) mit einer Z-Falte zwischen dem Boden und der Befestigung an der Außenhülse versehen ist.
5. Kreuzbodensack gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß der Kunststoff-Innensack (2) aus Polyethylen hergestellt ist.
6. Kreuzbodensack gemäß einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß der Kreuzboden mit einem gegen den Kreuzboden geleimten papiernen Siegelstreifen versehen ist.
7. Verfahren zum Herstellen von Kreuzbodensäcken gemäß Anspruch 1, wobei die Kreuzbodensäcke aus einer endlosen papiernen Hülse mit darin einer endlosen Kunststoff-Hülse, zusammen in einer flachen Form, die in Stücke geschnitten wird, hergestellt werden, wobei jedes Stück Hülse beim Ende wo der Kreuzboden gebildet wird mit Hilfe von an beiden Seiten des flachen Stücks Hülse wirksamen Unterdruckmitteln (10) geöffnet wird, zum Einbringen von Faltmitteln zum Falten des Kreuzbodens, wobei das Stück Kunststoff-Innenhülse ungeleimt in dem Kreuzboden mitgefaltet wird, **dadurch gekennzeichnet**, daß jedes papiere Stück Außenhülse (1) mit zumindest einer Aussparung (5) an zumindest einer Seite beim Ende wo der Kreuzboden gebildet wird versehen ist, und daß die Unterdruckmittel an einer Seite des flachen Stückes Hülse auch auf das Stück Kunststoff-Innenhülse (2) angreifen.
8. Sack mit einem offenen Ende und einem Ende das mit einem Kreuzboden versehen werden muß, umfassend eine papiere Außenhülse (1) und einen Kunststoff Innensack (2), wobei der Kunststoff-Innensack beim offenen Ende mit seiner Außenseite an der Innenseite der Außenhülse befestigt, insbesondere geleimt, ist und wobei der Kunststoff-Innensack bei seinem anderen Ende geschlossen, insbesondere versiegelt ist, und in dem Kreuzboden mitgefaltet werden muß, wobei der Kunststoff-Innensack dann von dem Kreuzboden getrennt ist, **dadurch gekennzeichnet**, daß die papiere Außenhülse (1) an zumindest einer Seite, nahe dem Ende wo der Kreuzboden gefaltet werden muß, mit zumindest einer Aussparung (5) versehen ist.

#### 55 Revendications

1. Sac à fond hexagonal comportant une extrémité ouverte et une extrémité pourvue d'un fond hexa-

- gonal, comprenant un tube ou sac extérieur en papier (1) et un sac intérieur en matière plastique (2) formé à partir d'un tube, dans lequel à proximité de l'extrémité ouverte, le sac intérieur en matière plastique est fixé, notamment par collage, au niveau de sa face extérieure sur la face intérieure du tube ou sac extérieur, et dans lequel le sac intérieur en matière plastique est fermé, et notamment est scellé, à proximité de son autre extrémité et est replié avec et dans le fond hexagonal, le sac intérieur en matière plastique étant séparé du fond hexagonal, caractérisé en ce que le tube ou sac extérieur en papier (1) est pourvu d'au moins un renforcement (5) situé sur au moins un côté, à proximité de l'extrémité, au niveau de laquelle le fond hexagonal a été replié.
2. Sac à fond hexagonal selon la revendication 1, caractérisé en ce que le renforcement (5) est rectangulaire au voisinage du bord du tube en papier (1).
  3. Sac à fond hexagonal selon la revendication 1 ou 2, caractérisé en ce que le sac intérieur en matière plastique (2) possède une longueur précisément égale à celle du tube extérieur en papier (1).
  4. Sac à fond hexagonal selon la revendication 1 ou 2, caractérisé en ce que le sac intérieur en matière plastique (2) est pourvu d'un pliage en Z entre le fond et la fixation au tube extérieur.
  5. Sac à fond hexagonal selon l'une quelconque des revendications précédentes, caractérisé en ce que le sac intérieur en matière plastique (1) est formé de polyéthène.
  6. Sac à fond hexagonal selon l'une quelconque des revendications précédentes, caractérisé en ce que le fond hexagonal est pourvu d'une bande de scellement en papier, qui est collée contre le fond hexagonal.
  7. Procédé pour fabriquer des sacs à fond hexagonal selon la revendication 1, selon lequel les sacs à fond hexagonal sont formés à partir d'un tube à papier sans fin contenant un tube en matière plastique sans fin, conjointement sous une forme plate, que l'on découpe en morceaux, chaque morceau du tube étant ouvert, à proximité de l'extrémité où le fond hexagonal est formé, à l'aide de moyens à dépression (10), qui sont actifs sur les deux faces du morceau plat de tube, pour insérer les moyens de pliage servant à plier le fond hexagonal, le morceau de tube intérieur en matière plastique étant replié dans le fond hexagonal, sans être collé à ce dernier, caractérisé en ce que chaque morceau de papier du tube extérieur (1) est pourvu d'au moins un renforcement (5) situé sur au moins un côté proche de l'extrémité, où le fond hexagonal est formé, et en ce que les moyens à dépression situés d'un côté de l'élément plat du tube s'appliquent également contre le morceau du tube intérieur en matière plastique (2).
  8. Sac comportant une extrémité ouverte et une extrémité fermée et qui doit être pourvu d'un fond hexagonal, comprenant un tube extérieur en papier (1) et un sac intérieur en matière plastique (2), et dans lequel à proximité de l'extrémité ouverte, le sac intérieur en matière plastique est fixé, notamment par collage, au niveau de sa face extérieure sur la face intérieure du sac extérieur, et dans lequel le sac intérieur en matière plastique est fermé, et notamment est scellé, à proximité de son autre extrémité et est replié avec et dans le fond hexagonal, le sac intérieur en matière plastique étant séparé du fond hexagonal, caractérisé en ce que le tube extérieur en papier (1) est pourvu d'au moins un renforcement (5) au niveau d'au moins un côté, à proximité de l'extrémité duquel le fond hexagonal doit être replié.

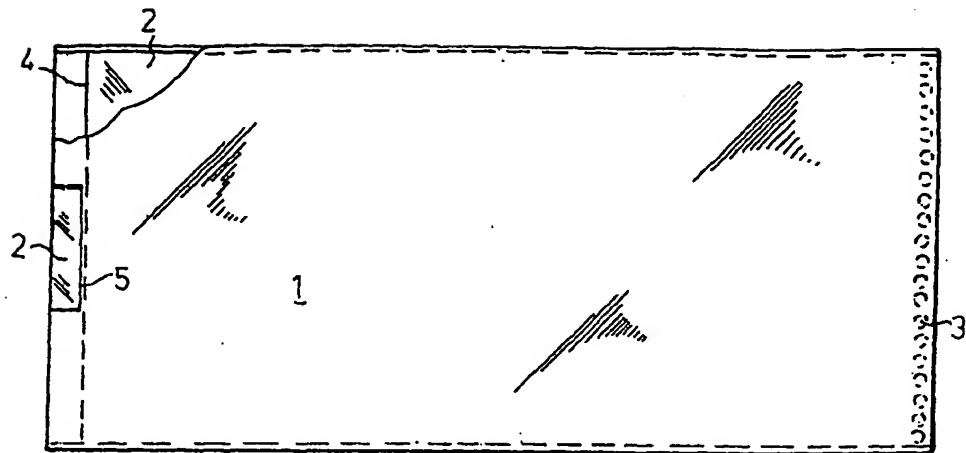


FIG. 1

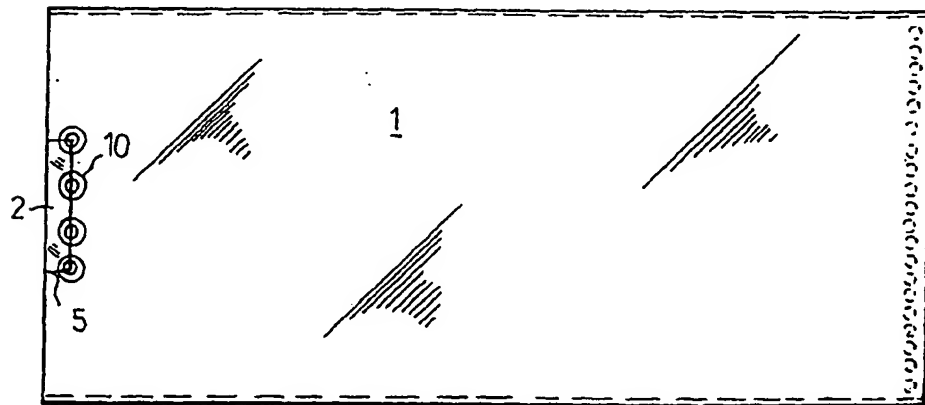


FIG. 2

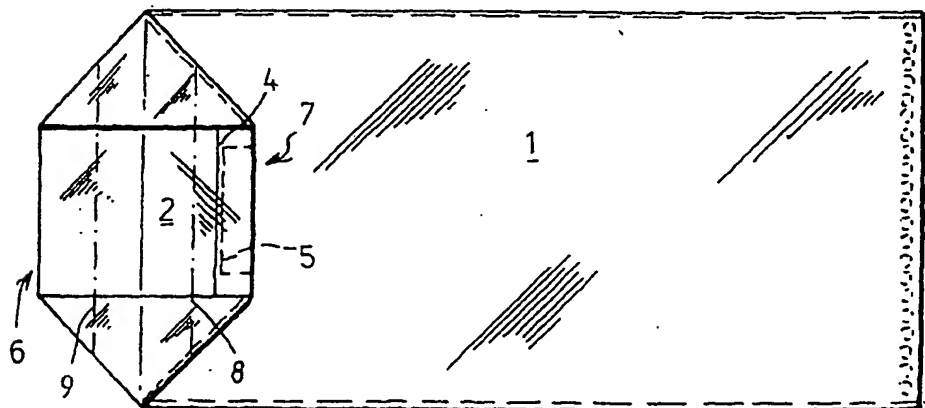


FIG. 3